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13. ABSTRACT *(Maximum 200 words)*

This thesis examines command, control, and communications (C3) interoperability between Australian and United States armies. The basis for interoperability between the two nations is reviewed, together with the current level of C3 interoperability as evidenced through recent combined activities. The fora that exist to address C3 interoperability rely on the efforts of key staff to progress interoperability issues which are often given low priority in acquisition and by commanders. Combined command and control issues are relatively well understood and should not provide a substantial impediment to combined operations. However, there is relatively little exercise of communications to which would support any future combined United States/Australian ground forces. Greater effort is required to determine the level of C3 interoperability, reflecting its importance. Communications exercises, the continued exchange of personnel and greater emphasis on C3 interoperability fora are required. Recent agreements on interoperability architecture provide a framework for interoperability, and the increased utilization of common technologies by the United States and Australia promise better interoperability. However, the promise of improvement will only be met if the two armies, particularly the Australian Army, ensure C3 interoperability is given a higher priority.

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COMMAND, CONTROL, AND COMMUNICATIONS INTEROPERABILITY BETWEEN THE AUSTRALIAN AND UNITED STATES ARMIES: AN AUSTRALIAN ARMY PERSPECTIVE

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

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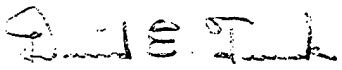

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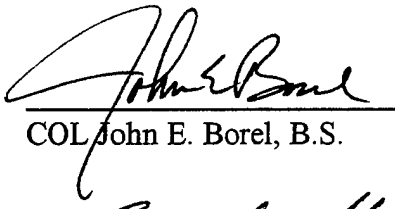

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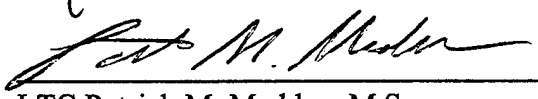

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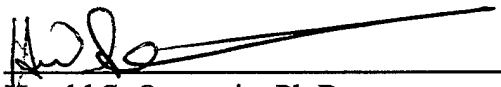

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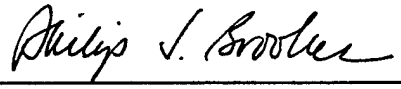

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other government agency. (References to this study should include the foregoing statement.)

ABSTRACT

COMMAND, CONTROL, AND COMMUNICATIONS INTEROPERABILITY BETWEEN THE AUSTRALIAN AND UNITED STATES ARMIES: AN AUSTRALIAN PERSPECTIVE by MAJ Martin I. Faulkner, Australian Army, 86 pages.

This thesis examines Command, Control, and Communications (C3) interoperability between the Australian and United States Armies. The basis for interoperability between the two nations is reviewed, together with the current level of C3 interoperability as evidenced through recent combined activities.

The fora that exist to address C3 interoperability rely on the efforts of key staff to progress interoperability issues which are often given low priority in acquisition and by commanders. Combined command and control issues are relatively well understood and should not provide a substantial impediment to combined operations. However, there is relatively little exercise of communications to which would support any future combined United States/Australian ground forces.

Greater effort is required to determine the level of C3 interoperability, reflecting its importance. Communications exercises, the continued exchange of personnel and greater emphasis on C3 interoperability fora are required. Recent agreements on interoperability architecture provide a framework for interoperability, and the increased utilization of common technologies by the United States and Australia promise better interoperability. However, the promise of improvement will only be met if the two Armies, particularly the Australian Army, ensure C3 interoperability is given a higher priority.

ACKNOWLEDGMENTS

My interest in the issues of Command, Control and, Communications interoperability between the Australian and US Armies was prompted chiefly by my experience as the Staff officer Grade Two, Communications and Information Systems Plans, at Land Headquarters, Sydney, Australia. The experience of assisting in the planning of communications for Exercise TANDEM THRUST 97 was particularly instructive regarding the positive aspects of the relationship between the Australian and US armies and the challenges involved in interoperability.

I wish to express my appreciation for the support and encouragement provided by several officers from Australia, each with an appreciation for the importance of interoperability with the US. Lieutenant Colonel Ian Williams, the Australian Liaison Officer to the CCEB in Washington, DC, provided an insight into current interoperability processes. Lieutenant Colonel Allan Black provided guidance born of several years involvement in interoperability both in Washington, DC, and Canberra. My former superior in Land Headquarters, Lieutenant Colonel Paul Straughair provided ideas and encouragement from a very practical perspective.

Finally, I wish to express my appreciation for the encouragement and guidance provided by my committee members, Mr Dave Turek, Colonel John Borel, Lieutenant Colonel Pat Madden and Dr Harry Orenstein. They provided sound advice and kept my thesis on track and my punctuation and grammar under control.

Naturally, responsibility for any errors or omissions in the thesis are mine alone.

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LIST OF ABBREVIATIONS

AAR	After Action Report
ABCA	American, British, Canadian, and Australian Armies Standardization Program
ACP	Allied Communications Publication
ADF	Australian Defense Force
ADFORM	Australian Defense Formatted Messaging System
ADFP	Australian Defense Force Publications
ANZUS	Australia, New Zealand and United States Treaty
AO	Area of Operations
AOR	Area of Responsibility
ARFOR	Army Force
AS	Australia
ASEAN	Association of South east Asian Countries
ATO	Air tasking Order
AUSTACSS	Australian Tactical Command Support System
AUTODIN	Automated Digital Network
A21	Army in the 21st Century (Australia)
BCSS	Battlefield Command Support System
BDE	Brigade
CA	Canada
CDF	Chief of Defense Force
CFC	Combined Force Commander
CINC	Commander in Chief
CINCPAC	Commander in Chief Pacific
CIS	Communications and Information Systems
CJSC	Chairman of the Joint Chiefs of Staff
CNR	Combat Net Radio
COCOM	Combatant Command
CPX	Command Post Exercise
C&SP	Command and Staff Procedures
C2	Command and Control
C3	Command, Control, and Communications
C3I	Command, Control, Communications, and Intelligence
CCEB	Combined Communications Electronics Board
CCIB	Command and Control Interoperability Board
CITA	Combined Interoperability Technical Architecture
COE	Common Operating Environment
COMSEC	Communications Security
COTS	Commercial off the Shelf
DISCON	Defense Integrated Secure Communications network

DIV	Division
DMS	Defense Messaging System
DOC	Doctrine
DOD	Department of Defense
GCCS	Global Command and Control System
HICOMMEX	Higher Communications Exercise
HQ	Headquarters
HQASF	Headquarters Australian Forces Somalia
HRS	Humanitarian Relief Sector
ID	Infantry Division
IEG	Information Exchange Group
JCOMMEX	Joint Communications Exercise
JCSE	Joint Command Support Environment
JITA	Joint Interoperability Architecture
JITC	Joint Interoperability Test Center
JTF	Joint Task Force
JWID	Joint Warrior Interoperability Demonstration
LNO	Liaison Officer
MCS	Maneuver Control System
MEF	Marine Expeditionary Force
MFO	Multi National Force and Observers
MSE	Mobile Subscriber Equipment
MTN	Mountain
NATO	North Atlantic Treaty Organization
NCA	National Command Authority
NIPRNET	Non-secure Internet Protocol Routed Network
OPCOM	Operational Command
OPCON	Operational Control
QAP	Quadripartite Advisory Publication
QSTAG	Quadripartite Standing Agreement
QWG	Quadripartite Working Group
RAR	Royal Australian Regiment
RASIGS	Royal Australian Corps of Signals
REGT	Regiment
SHAEF	Supreme Headquarters Allied Expeditionary Forces Europe
SIG	Signal
SIPRNET	Secure Internet Protocol Routed Network
SPW	Special Working Party
STA	Satellite Terminal Assembly
STANAG	Standardization Agreement
STMP	Simple Message Transfer Protocol
TACON	Tactical Control

TADIL	Tactical Data Links
TTCP	Technical Cooperation Program
UHF	Ultrahigh Frequency
UK	United Kingdom of Great Britain and Northern Ireland
UN	United Nations
UNITAF	United Task Force
UNOSOM	United Nations Operations in Somalia
US	United States
USMC	United States Marine Corps
USMTF	US Message Text Format
VTC	Video Teleconferencing

CHAPTER 1

INTRODUCTION

The Australian Army has an extensive history of involvement in multinational operations, from the earliest commitment of troops in colonial Australia to fight alongside British and other colonial contingents in New Zealand, the Sudan, and South Africa. Since federation in 1901, Australia has seen additional larger scale commitments of troops to World War I and World War II, the Korean War, Vietnam, and a number of smaller contingencies.

Since the end of the Vietnam conflict, with the exception of peacekeeping commitments, Australia's focus has been on the defense of Australia. Government direction has been toward a policy of defense self-reliance. The Australian Government has stated its responsibility to the Australian people to be one of providing for Australia's own defense.[1] However, there remains in Australian Government and Defense circles the general acknowledgment that Australia has obligations which may require it to participate as a member of a coalition.

These potential coalitions may include membership in a United Nations (UN) peacekeeping force, meeting obligations under existing bilateral and multilateral treaty obligations or improvised arrangements as a result of Australia is determining that it is in

[1] Australian Government, *Strategic Review, 1993* (Canberra, Australia: Director of Publications, 1993), 39.

the national interest to join with other nations to meet a common threat.[2] Consequently, there are a range of potential coalition commitments for the Australian Defense Force (ADF). Further it is generally acknowledged that such a coalition is likely to be undertaken with the United States (US). Australia's effectiveness in contributing to UN and other multilateral coalition activities is therefore seen as being determined in part by its interoperability with the US.[3]

The military alliance between the US and Australia as formalized by the ANZUS (Australia, New Zealand, and United States) Treaty, which came into effect in 1952, is regarded as the foundation of the defense relationship with the US.[4] From the Australian perspective, the advantage is perceived as being both for its deterrence value to any potential aggressor and for the practical support gained from the US in the areas of science, technology and intelligence.[5] Australia's reciprocation includes support to the US in its continued regional engagement and to US regional policies, where they are complimentary to Australia's. Consequently, the Australian Government's latest White Paper on Defence, "Strategic Policy 1997," places specific emphasis on the acquisition of systems that allow interoperability with the US. Specifically: "The challenges in alliance management over the next few years will include sustaining our military capacity to

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[2] Australian Government, *Defending Australia - Defence White Paper, 1994* (Canberra, Australia: Australian Government Publishing Service, 1994), 85, 96 & 104.

[3]Ibid., 99.

[4]*Strategic Review, 1993,* 35.

[5]Ibid., 35.

operate with the United States by investing in necessary systems, and exploring new forms of practical cooperation for example in the collaborative development of new systems and platforms."[6]

Purpose of the Thesis

The purpose of this thesis is to research the current doctrine on command, control, and communications (C3) and the recent Australian Army experience in coalition operations to determine how well prepared the Australian Army is to participate in future operations with its most likely coalition partner.

The scope of this paper will encompass existing C3 interoperability between Australia and the US. It will address the doctrine upon which interoperability is based and projections for future interoperability in light of the significant changes being undertaken by the countries in terms of doctrine and systems. The focus of the thesis will be on interoperabilty between land forces.

The primary question to be addressed by the paper is, **What is the standard of C3 interoperability between the Australian and US Armies?**

Secondary questions to be considered include:

1. What are the likely coalition operations that Australia may become involved in with the US?

2. What is the likely impact of the current standard of C3 interoperability between the Australian and US Armies on coalition operations?

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[6] Commonwealth of Australia, *Australia's Strategic Policy* (Canberra, Australia: Director Defence Publishing and Visual Communications, 1997), 19.

3. What processes are in place to address existing Australia/US C3 interoperability issues?

4. How effective are these processes?

5. What is the likely future standard of Australia/US C3 interoperability?

6. What steps should be undertaken to improve the prospects for Australian Army C3 interoperability with the US?

Background

Australia and the US are allies of long standing, and their armies have been involved in combined operations since France in World War I and most recently during Operation RESTORE HOPE in Somalia. It is likely that future Australian Army commitments, either in a combined operation or as part of a wider coalition, will require the Australian and US armies to interoperate.

This thesis will draw upon experience gained on Operation RESTORE HOPE, the ABCA Exercise (CASCADE PEAK 96), and the recent large US-led combined exercise held in Australia in March 1997 (Exercise TANDEM THRUST 97) to illustrate recent experience of combined/coalition operations between Australia and US. The successes and problems in the area of C3 will provide a backdrop to the discussion of doctrine and recent publications in the area, few of which have been written from the Australian perspective.

The preponderance of coalition operations in recent years following the end of the cold war and advent of new global political realities has brought a renewed interest in

coalition operations. Particularly in the US, the difficulties of command and control and the associated supporting communications infrastructure in such coalition operations are being considered. This is both a result of difficulties experienced in recent operations and an attempt to better execute such missions in the future. The Australian Army lacks such detailed studies of the emerging problems of coalition operations, particularly with respect to C3 from its own perspective.

ABCA and CCEB. The most significant body of writings are those from the American, British, Canadian, and Australian Armies Standardization Program (ABCA) and the Combined Communications Electronics Board (CCEB). The ABCA endeavors to continue the cooperation between allied armies established during World War II and includes the US, Britain, Canada, and Australia, with New Zealand as a nonsignatory member through Australia.[7] Joint and combined communications and information systems interoperability issues are primarily dealt with by paralleling the Army focused ABCA process.[8] The ABCA publishes Quadripartite Standing Agreements (QSTAGs), which detail interoperability standards. A major product of the CCEB is the series of Allied Communications Publications (ACPs), which detail combined and joint communications procedures. Together these will provide tangible standards for communications and information systems interoperability between the US and Australia.

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[7] Australian Defence Force Warfare Centre, Australian Defence Force Publication (ADFP) 2 Supplement 1, *International interoperability Handbook* (Canberra, Australia: Director Publishing Defence Centre, 1995), 6.1.

[8] Ibid., 7.1-7.2.

Australia/US Communications Forum In addition there is the Australia/United States Communications Forum. This forum was established by authority of the ANZUS Military Representatives Meeting. The emphasis is on tactical communications interoperability and strategic connectivity programs that could affect the nations. This forum is required to support the lead role taken by the ABCA and CCEB.[9]

The existing problems in interoperability between Australia and the US may also be exacerbated as the pace of the separate development of a new C3 infrastructure occurs under Force XXI in the US and Army 21 (A21) in Australia.

Key Terms

Terminology used in this paper will be, unless otherwise noted, that which is defined in Joint Publication 1-02, *DOD Dictionary 23 Approved Terminology*, March 1994, updated April 1997. Key terms are detailed in the glossary.

Underlying Assumptions

The key underlying assumptions for this paper are:

1. Operation RESTORE HOPE, Exercise CASCADE PEAK 96, and Exercise TANDEM THRUST 97 are indicative of the current level of C3 interoperability achieved between Australia and the US.

2. Extant agreements for the exchange of technical information and for formulating combined interoperability policy will continue.

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[9] Ibid., 3.1-3.3.

3. Planned C3 developments in both Australia and the US will follow currently projected paths.

Limitations

Limitations in researching this subject include:

1. The lack of documented formal research on interoperability problems between the ADF and US forces and, in particular, the respective Armie.

2. The difficulty of estimating the likely impact of rapid changes affecting the Australian and the US in integrating new technology into C3, and their impact on interoperability.

3. Coalition/Combined Operations C3 doctrine is still under development in Australia and within the ABCA community.

Consequent Approach to the Paper

To overcome some of the shortfalls in documentation of the problem, additional reliance will have to be placed on After Action Reports (AARs) from recent combined activities (e.g., Operation RESTORE HOPE, Exercise CASCADE PEAK 96, and Exercise TANDEM THRUST) and, where applicable, ABCA working papers and doctrine. In addition, the author's personal experiences gained as the Staff Officer Grade Two Communications and Informations Systems Plans, Communications and Information Systems Operations Section, Operations Branch, Land Headquarters, Australian Army have also been applied to the analysis. This included participating in the Middle and Final Planning Conferences for Exercise TANDEM THRUST 97 and providing operational level support to Australian elements involved in the exercise.

To overcome the lack of specific Australian doctrine and publications, a review of the principles of combined operations and the importance of C3 interoperability will be drawn from more generic studies. In addition, more mature doctrine from other sources, particularly the US, will be reviewed.

In order to anticipate the effects of the somewhat uncertain future path of C3 development in the Australian and the US Armies, some projections based on planned developments will need to be made.

This thesis aims to review the ability of the Australian and US Armies to achieve C3 interoperability. Through a review of recent Australian and US Army and other relevant coalition experience, and C3 doctrine from both nations, it is proposed to identify those areas which require review in order to better assure C3 interoperability between the Armies.

CHAPTER 2

LITERATURE REVIEW

During the thesis research four main information sources have been examined:

1. Publications establishing Australia's strategic setting and associated Government and Military papers on the employment of the Australian military
2. Publications addressing problems of C3 in the coalition and joint environment
3. Available doctrine on C3 in coalition/combined operations
4. Relevant journal articles

In addition, available after action reports (AARs) on coalition operations and exercises have been reviewed, with an emphasis on Operation RESTORE HOPE, Exercise CASCADE PEAK 96 and Exercise TANDEM THRUST 97.

Australia's Strategic Setting

There are a number of documents which set out the strategic setting for Australia and consequently the basis for the potential employment of the Australian Army on coalition operations. The key documents establishing formal policy are the Australian Government's *Strategic Review, 1993;* the *Defence White Paper, 1994;* and most recently the Australian Government policy paper *Australian Strategic Policy, 1997.* In addition, there are a number of policy speeches and interviews with key senior government and military leaders which serve to amplify the policy, particularly in a more current context.

The Army and The Future, Land Forces in Australia and South-East Asia is an Australian Department of Defence publication which provides a collection of articles by senior political, military, and academic figures from Australia, the US, and South East

Asia. The essays arise from the 1992 Australian Chief of the General Staff's Land Warfare Conference and examine security issues in the Pacific and South East Asia.

Also, relevant to defining the potential for employment of the Australian Army in coalition operations are papers written by Australian and US scholars examining the particulars of Australia's strategic position, in particular relative to combined operations with the US. These articles are drawn from *Parameters*, the *Asia Pacific Defence Reporter, Janes Defence Weekly* and the *Australian Journal of International Affairs.*

Publications on Command and Control Related Issues

There have been numerous publications in the area of C3 interoperability in recent years. The majority of these have been concerned with joint interoperability within the US services. There have also been a number of papers addressing coalition interoperability in the wake of operations DESERT SHIELD/DESERT STORM and the perceived increased importance of coalition or multinational operations in the "new world order." In addition, there are a number of papers that have been written on NATO interoperability.

The publication which gives the best overview of command and control issues as they affect coalitions is Martha Maurer's *Coalition Command and Control.* This book gives an overview of the breadth of problems and factors to be considered in ensuring coalitions are able to work effectively together. Issues encompassed range from technical interoperability of communications and releasability of nationally sensitive information to cultural concerns. Written principally from the US perspective, it is a good introduction to the problems of C2 in coalitions.

Command and Control for War and Peace by Thomas Coakley provides a general introduction to the basic considerations of C2 in a military environment and is a useful text for clarifying the fundamentals of C2. Kenneth Allard's *Command Control and the Common Defense* is a discussion of the problems of integrating C2 in a joint environment. Again written from a US perspective, it provides a thorough examination of the problems of dealing with service cultures and conflicting requirements.

Also written by Kenneth Allard is *Somalia Operations: Lessons Learnt*. This book provides an overview to a number of the key issues which arose in Somalia from the US perspective, including aspects of C3. However, there is no detailed examination of the particulars of any interoperabilty issues between deployed Australian and US Forces. It provides, however, a good insight into the setting for the coalition operations in Somalia and resultant C2 and, to some extent, communications issues.

Also addressing issues of C2, principally from the US perspective, is Major Harold E. Bullock's "Peace by Committee. Command and Control Issues in Multinational Peace Enforcement Operations." Bullock reviews both Somalia and an earlier regional coalition peace enforcement operation, the Organization of American States deployment to the Dominican Republic in 1965-66. His paper is useful for the historical perspective it brings to coalition operations.

"Interoperability A Desert Storm Case Study" provides a more technical study of a coalition operations, delving into C3 issues. This paper, although it does not deal with the specific operations which this thesis is using as case studies, provides a C3 insight into coalition operations in general, born out of the largest such operation in recent years.

"The Australian Defence Force Gulf War Study" provides primarily a review from an ADF perspective, of US and Coalition operations during the conflict. It has only limited material on Army related issues.

Doctrine and Related Publications

There are a number of publications from the ABCA which provide insight into the issues of C3 in coalition operations. These include the: "Draft Quadripartite Working Group Communications and Information Systems; Joint US, UK, AS and CA Ground Force Working Paper, Assessment of Existing Planned Systems Interoperability." This gives an overview of the current state of communications interoperability among the respective countries and the expected changes and improvements as a result of projected new equipment acquisitions and changes to policy and doctrine. The "ABCA Quadripartite Advisory Publication (QAP), Number 125, Edition 1, Commander's Critical Information Requirements," examines the commander's decision making process and information required to support it. It provides a useful introduction to the potential requirements of an Australia/US coalition commander's information needs.

In addition there are a number of ABCA AARs which provide practical insight into coalition operations. The ABCA Exercise CASCADE PEAK 96 provides some specific recommendations in the C3 areas to facilitate better interoperability between the nations and is especially relevant as it relates to a command post exercise (CPX) where an Australian brigade worked for a US Corps HQ.

Australian Doctrine and Policy

Joint Doctrine. Principal amongst Australian doctrine pertaining to combined operations, including with the US, is the Australian Defence Force Publication (ADFP) series. This is the series of joint publications issued under the authority of the Australian Chief of Defence Force by the Australian Joint Warfare Establishment as capstone joint doctrine. The significant writings for this paper are ADFP 2, Supplement 1, *International Interoperability Handbook*, and ADFP 10, *Joint Tactical Communications*. These documents detail, respectively, the framework for international agreements on interoperability and ADF joint communications doctrine. From the Australian joint perspective the lack of specific Australian Doctrine on combined/coalition operations reveals a deficiency in current Australian doctrine.

Army Doctrine. Australian Army doctrine does not address combined operations in detail. The capstone documents for command and control and tactical communications are respectively the Australian Army Manual of Land Warfare Part 1, Vol 1, Pamphlet No.2, *Command and Control*, and Australian Army Manual of Land Warfare Part 2, Vol 1, Pamphlet No.1, *Land Force Tactical Communications*. Neither of these manuals addresses the problems of coalition operations other than in brief reference, and both would be a problematic start for planning Australian participation in coalition operations.

US Doctrine

US policy on interoperability with ABCA countries is also covered by the ABCA and Australia/US Communications forum references cited above. Key US Joint doctrine relevant to multinational operations is Joint Pub 6-0, *Doctrine for Command, Control,*

Communications and Computers to Joint Operations, and Joint Pub 6-02, *Joint Doctrine for Operational/Tactical Command Control and Communications Systems* and the *Joint Task Force Commander's Handbook for Peace Operations.*

FM 100-8, *Combined Army Operations,* provides a US Army perspective on command and control and other issues associated with participation in combined operations. FM 100-23, *Peace Operations,* also discusses some aspects of command and control in multinational peace operations.

Operation RESTORE HOPE/SOLACE (AS)

There are a number of post activity reports from Operation RESTORE HOPE/SOLACE, including from the Australian Army, which are relevant to this paper in terms of commenting on the combined Australian/US deployment in Somalia. These will provide some of the basis for comment on Australian/US interoperability as part of the United Task Force (UNITAF). The Australian C3 evaluation comments on interoperability issues and on the importance of the support provided to the Australian force by 10th Mountain Division and 11th Signal Brigade. In addition, the draft Australian Army official history of Australia's deployment also considers C3 issues.

Several US reports on Operation RESTORE HOPE have also been reviewed in an attempt to evaluate the degree of interoperability achieved with the Australian contingent from the US perspective. The major report available in addition to Allard's is that of 10th Mountain Division. Information was also sought from 11th Signal Brigade; however, there was no discussion of interoperability with the Australian battalion group in the

available documents.[10] Unfortunately there is no detailed comment on C3 interoperability issues with the Australian contingent in the US AARs reviewed.

Exercise TANDEM THRUST 97

The Australian perspective on interoperability with US forces deployed for Exercise TANDEM THRUST 97 is discussed in the AARs from the Australian signals elements which were closely involved in coordinating joint and combined communications and information systems for the exercise. The discussion covers both planning and execution of C3 and problem areas which arose. The reports explain which issues were able to be resolved and those that remain outstanding issues in interoperability.

Exercise CASCADE PEAK

Exercise CASCADE PEAK was an ABCA CPX conducted at Fort Lewis, Washington, in late 1996. The scenario involved the US as lead nation in a coalition with a Canadian division and an Australian brigade, together with UK staff augmentation. The after action report is useful for the analysis of a number of interoperability issues that arose between the ABCA nations.

Past Master of Military Art and Science Theses

Several past Master of Military Art and Science papers are also relevant to this thesis. Papers on command and control of communications in joint and combined operations' intelligence fusion for combined operations and providing interoperable

[10] CAPT Grant Beer, Australian Exchange Officer, 11th Sig Bde, email to author, 4 December 1997.

information support to an army-led joint task force provide useful insight into the problems of joint and combined C3 interoperability.

CHAPTER 3

METHODOLOGY

The methodology employed in this paper for addressing C3 interoperability between the US and Australia will be to commence with a review of the basis for cooperation between the two militaries, the current agreements and an assessment of their effectiveness. The focus will be on the ANZUS treaty, ABCA, CCEB and the various responsibilities accepted by parties to the agreements.

The paper will also survey current practices for overcoming interoperability problems and analyze potential methods to improve the interoperability of the two Armies. In particular the paper will review the existing ABCA and CCEB processes for efficiency in ensuring interoperability between Australia, the US and the other member nations. An assessment of the future for tactical C3 interoperability between the US and Australian Armies and the likely impact on operations in a coalition will be made.

Interoperability problems reported in after action reports from operations and exercises where the US and Australian Armies have worked together will be reviewed for areas requiring future emphasis from the interoperability fora. The review firstly determines gaps in the coverage of agreements, those areas where there exist problems in C3 interoperability which need addressing, and subsequently considers how well extant agreements are adhered to. After action reports will provide examples of both issues. In addition, a review of other selected coalition operations not necessarily involving Australia and the US may be indicative of problems that are not currently addressed by the ABCA, CCEB or ANZUS working groups.

The published AARs were supplemented by interviews with personnel involved in relevant activities to elicit their personal perspectives on the areas of concern in their experience. The aim is to draw on practical examples of those areas with a good working standard of interoperabilty and those which have proven more problematic.

A comparison will also be made between the current Australian and US doctrine to determine areas of difference with the ABCA and ANZUS agreements, to assess the potential impact on interoperability. National doctrine and policy on C3 will be examined against a background of increased emphasis on coalition force operations conflicting with national priorities.

An overview of particular critical systems will also elicit those areas of communications and information systems (CIS) that are critical to coalition interoperability. Subsequently major current Australian and US systems will be reviewed to determine the level of interoperability and implications for the command and control of the two Armies in coalition. The potential for a growing gap in technology between the US and Australia and implications for the ability of the two Armies to achieve seamless C3 will examined. The focus will be on those systems that might normally be expected to provide links between formations in a tactical environment according to ABCA doctrine.

Future trends for C3 will also be reviewed to highlight systems that may not be specifically addressed in existing doctrine but which are of increasing importance as the deployment of new technology, both hardware and software, including commercial off the shelf systems, outpaces doctrine. The impact of simple differences, such as the

selection of word processing suites and associated applications such as spreadsheet and database tools, will also be considered for the potential impact on the ease with which interoperability can be achieved.

In particular, the implications of the different information systems being utilized by both armies as an integral part of their command and control for coalition operations between Australia and the US will be investigated. The interoperability of the systems will be reviewed and implications of the their deployment considered.

CHAPTER 4

ANALYSIS

Australia's Strategic Setting and the Importance of the US Alliance

The relative importance placed on the Australia/US alliance by the Australian Government is reflected in the most recent Australian Government policy paper, Australia's Strategic Policy, published in late 1997. It states that: "Our [Australia's] alliance with the United States is by any measure our most important strategic relationship. It is a major strategic asset and its preservation and development is among our highest strategic priorities."[11]

> There is also clear recognition of the significance of the Australia/US relationship from the US perspective. The US National Security Strategy states: "Our security aims in Southeast Asia are twofold: (1) maintaining robust security alliances with Canberra, Manila and Bangkok, as well as sustaining security access arrangements with Singapore and other ASEAN countries; and (2) healthy, pragmatic relations with a strong cohesive ASEAN capable of supporting regional stability and prosperity."[12]

The National Military Strategy states: "Five of the seven US mutual defense treaties are with partners in the Asia-Pacific region, helping to underpin the relative security of an area that is home to the world's fastest growing economies."[13]

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[11] Commonwealth of Australia, *Australia's Strategic Policy* (Canberra, Australia: Director Defence Publishing and Visual Communications, 1997), 118.

[12] President of the United States of America, *A National Security Strategy for a New Century*, (Washington, DC: The White House, 1997), 24.

[13] Chairman of the Joint Chiefs of Staff, *National Military Strategy of the United States of America 1995*, (Washington, DC: Joint Chiefs of Staff, 1995), 10.

One of the treaties referred to is ANZUS. This is amplified in the testimony before congress of the US Commander in Chief Pacific (CINCPAC), Admiral Joseph W. Prueher, on 18 March 1997: "Australia is a staunch ally and one of our most reliable and innovative friends. The Joint Security Declaration signed at the July 1996 Australia-US Ministerial and the November 1996 Presidential visit reaffirmed the vitality of this relationship." Hence, at the strategic level there is acknowledgment of the importance of the alliance between Australia and the US.

The Australian Minister for Defense, Mr Ian McLachlan, confirmed the ongoing relevance to Australia of its close relationship with the US in a changing Asia-Pacific: "The potential cost of the expansion of military capabilities in the region is that, should a conflict ever emerge in Asia-Pacific, such a conflict would be enormously destructive. That reinforces the need to promote security and cooperation. We are going through a number of ways to enhance our excellent relationship with the US."[14]

What Part Interoperability?

Interoperability is key to the potential successful cooperation of the militaries of the two nations. This is very clearly recognized by the Australian Government: "The challenges in alliance management (referring to ANZUS) over the next few years will include sustaining our military capacity to operate with the United States by investing in

[14] Mr. Ian McLachlan, Australian Minister for Defence, "Interview," *Janes Defence Weekly*, 7 August 1996, 40.

necessary systems, and exploring new forms of practical cooperation - for example in collaborative development of new systems and platforms."[15] More specifically:

> Another issue we need to take into account in planning our forces is interoperability--the ability to cooperate with the forces of other nations to undertake combined operations. In future, as combat capability is increasingly tied to continual real time communication of intelligence, surveillance, command and coordination information, the interoperability of these systems will become more important to achieving substantial effective tactical cooperation, especially in air and naval forces, and it will become increasingly difficult and expensive to maintain such interoperability with US forces, as the pace and level of their investment in such systems continues to grow .We will give the highest priority to maximizing interoperability with the United States at the higher level, and be prepared to make significant investments to sustain such interoperability as new systems are introduced.[16]

The US National Military Strategy also recognizes the importance of cooperative arrangements with allies: "While we maintain the unilateral capability to wage decisive campaigns to protect US and multinational security interests, our Armed Forces will most often fight in concert with regional allies and friends, as coalitions can decisively increase combat power and lead to a more rapid and favorable outcome to the conflict."[17]

Further, one of the benefits of US Security Assistance is stated as "improving interoperability between US and allied and friendly forces."[18] Hence, interoperability with allied nations, such as Australia, is a concern for the US. The balance of this chapter

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[15] *Australia's Strategic Policy 1997*, 19.

[16] Ibid., 47-48.

[17] *National Military Strategy of the US, 1995*, 13.

[18] Ibid., 8.

will examine how effectively interoperability in Command, Control, and Communications has been achieved with one of those allies, Australia.

In terms of a combined command and control organization to support operations together, Australia and the US have historical examples, in addition to ABCA models, to draw upon. An early example of multinational operations in which both the US and Australia participated was the Western Alliance in France during World War I. The failings of this example of command and control, chiefly the lack of unity of command and ability to influence the battle, are well documented.[19] The World War II example was a more complete and successful example of coalition operations. Australia and the US had their most significant alliance in the South West Pacific. Adopting an integrated model, the US provided the senior commander, General MacArthur, with a mixture of American and Australian staff and commanders in support, notably Australian General Blamey as Commander Land Forces.[20] In subsequent operations in Korea the US operated as lead nation in the UN sanctioned coalition, with Australia contributing to the British Commonwealth Brigade. In Vietnam the Australian Army contribution of a brigade sized task force and logistic support elements was relatively modest compared to

[19] COL Anthony J. Rice, "Command and Control: The Essence of Coalition Warfare," Parameters, Spring 1997, 155-156.

[20] Eric Bergerud, *Touched With Fire, The Land War in the South Pacific,*(New York: Penguin, 1996), 248.

the overall size of the US effort and effectively operated under operational control of the US.[21]

Since Vietnam, US/Australian operations have been limited to the Gulf War and modest participation in Operation RESTORE HOPE in Somalia. Relatively few lessons for the Australian Army can be drawn from Australian participation in the Gulf War as this was limited to a few ships and specialist personnel. Australia's Gulf War Study Team noted the unique nature of the higher level command and control and the significant advantage of established combined doctrine and training to NATO members deployed.[22]

Operation RESTORE HOPE was the first time since Vietnam that Australian ground forces were deployed on operations as part of a US led coalition. The battalion group that deployed operated under the operational control of the US UNITAF force headquarters.

Some of the best lessons for interoperability between the US and Australia are combined exercises which have occurred in recent years. Included in these are the ABCA sponsored Exercises NORTHERN LIGHTS and CASCADE PEAK, and the US-Australia combined Exercise TANDEM THRUST 97.

In order to achieve a sound degree of C3 interoperability, several factors need to be in place:

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[21] Rice, 161.

[22] ADF Gulf War Study Team, "The Gulf War" (Canberra, Australia: Australian Chiefs of Staff Committee, October 1991),10 & I-8.

1. Intent by the participating countries, for example, the US and Australia, as demonstrated above,

2. A mechanism for common doctrine, and

3. The ability to execute the doctrine through interoperable communications and information systems.

The Imperative--Likely Future US/Australia Operations

> Notwithstanding our strong focus on the Asia-Pacific region, Australia also has clear strategic interests at the global level. The foremost of these is our interest in supporting the United Nations in its primary function of resisting aggression around the world....Australia also has strong strategic interests in the United States accepting, and being accepted in, the global role that it has evolved over the past few years, as the predominant support to an orderly international community, especially via the UN.[23]

Australia sees a sure role for its military in cooperation with the US. The US anticipates it will likely fight in future conflicts as part of a combined force: "Coalition with allies is the norm. This implies a need for interoperability, accommodation of allied objectives and capabilities and some policy limitations."[24]

What then are circumstances in which the US and Australian Armies might be involved in combined operations in the near to medium future? The Australian Government sees a role for its armed forces in support of UN operations, probably with a US lead. Australia has also demonstrated a willingness in recent years to contribute troops to non-UN operations alongside the US, the prominent cases being Operation

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[23] *Australia's Strategic Policy, 1997*, 32.

[24] FM 100-5, 2-2.

RESTORE HOPE and also the Multinational Force and Observers (MFO) in the Sinai, Egypt.

ABCA exercises also provide an insight into the perceived scenarios for combined operations. The "Regional Conflict" scenario pictures an Australian brigade as part of a US Corps. This is basically the model practiced in Ex CASCADE PEAK in late 1996. Other scenarios feature Australian battalion sized units operating under a fellow ABCA nation's command.[25] These are similar to the situation which occurred in Somalia, where an Australian battalion group for a time worked with the American 10th Mountain Division.

If the ABCA scenarios are accepted as realistic, then the essential measure of C3 interoperability between the US and Australia is the ability of the two nations' Armies to operate together with up to an Australian Brigade working with a US higher headquarters. The ability of command and control doctrine and supporting communications and information systems to support such a concept will be examined.

Mechanisms for Achieving Interoperability

The history of interoperability concerns between Australia and the US can be traced back to World War II, when the two nations fought together as members of the Western Alliance. Combined US/Australian operations were prominent in the South West Pacific campaigns. Following World War II, the US and British leadership in

[25] ABCA. ABCA Doctrine Guide. (Washington, DC: ABCA Standardization Office, 1994) ch 3.

particular were anxious that lessons learnt and the degree of interoperability amongst members of the Western Alliance achieved during conflict not be lost in its aftermath.

The initial "Plan to Effect Standardization" of 1947, covering the Armies of the US, United Kingdom and Canada, was later changed to the Basic Standardization Agreement. With the inclusion of Australia in the forum in 1964, the America, Britain, Canada and Australia (ABCA) Armies Standardization Program was established with the aim to:

1. Ensure the fullest cooperation and collaboration among the ABCA Armies;

2. Achieve the highest possible degree of interoperability among the signatory Armies through material and non-material standardization; and

3. Obtain the greatest possible economy by the use of combined resources and effort.[26]

The current Program Strategy is: "To ensure that Armies achieve agreed levels of standardization necessary for two or more ABCA Armies to operate effectively together within a coalition, primarily in low and mid-intensity conflict."[27]

The ANZUS Treaty alliance relationship between Australia and the US provides the strategic basis for a requirement for interoperability and the ABCA the major army forum within which the need can be realized. The ABCA facilitates improved interoperability through a number of mechanisms:

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[26] *ABCA Armies Standardization Program information Handbook.* (Canberra, Australia: Director Publishing, Defence Center Canberra, 1996), 1.

[27] ABCA *Armies Standardization Program information Handbook*, 1

1. Correspondence between Armies, that is., comments on new projects, developments, and doctrine and information necessary for preparation of Quadripartite Standardization Agreements (QSTAGs), equivalent to NATO STANAGs;

2. Quadripartite Working Groups (QWGs) and Special Working Parties (SWPs), which are working groups assigned to work out the detailed standardization requirements and agreements for ratification by each nation. The significant QWGs associated with C3 are the QWG Communications and Information Systems (QWG CIS), the QWG Command and Staff Procedures (QWG C&SP) and the QWG Doctrine (QWG Doc).

3. Information Exchange Groups (IEGs), a structure under the auspices of ABCA which facilitates the exchange of individuals and organizations working in related fields; and

4. Standardization Representatives, which are officers posted to each of the member nations to provide a liaison function and attend meetings associated with the ABCA.

In addition, there are a number of other interoperability fora which are not strictly part of the ABCA mechanism, but perform related functions and liaise closely on interoperability issues. Key amongst these in the Army C3 area are the Combined Communications Electronics Board (CCEB), the Command and Control Interoperability Board (CCIB), the Australia/US Communications Forum and The Technical Cooperation Program (TTCP).

The CCEB. The CCEB has joint representatives from five nations, the US, UK, Canada, Australia (since 1969) and NZ and focuses at the joint and combined level, rather than specifically army to army as with the ABCA. It is responsible for "coordinating any military communications-electronics matter referred to it by a member nation. This includes the responsibility for interoperability matters concerned with communications and information systems in support of command and control. It also includes responsibility for the content, format and release policy of allied communications publications and their general supplements."[28]

The CCIB. The CCIB was founded under a memorandum of understanding between Australia and the US in 1987. It "recognizes that the use of compatible interoperable command and control systems would enhance effectiveness in combined operations in support of ANZUS security objectives."[29] The program is allied to similar processes in place in the US joint environment. The recent focus of this forum has been on achieving interoperability with formatted messaging systems and Tactical Digital Information Links (TADIL). Importantly, the memorandum of agreement provides that CCIB determinations "in respect of the cooperative program established on command and

[28] Australian Defence Force Warfare Centre, *Australian Defence Force Publication (ADFP) 2 Supplement 1, International interoperability Handbook* (Canberra, Australia: Director Publishing Defence Centre, 1995), 7.1.

[29] Ibid., 2.1.

control interoperability take precedence over determinations of command and control programs established by the individual armed forces of the two countries."[30]

Australia/US Communications Forum. This was originally founded as the ANZUS Communications Forum prior to the downgrading of defense cooperation between the US and NZ in the aftermath of New Zealand imposing restrictions on port visits by nuclear capable warships in the mid 1980s. It was formed under the auspices of the ANZUS Military Representatives Meeting and has an emphasis on promoting tactical communications interoperability. Since 1990 the forum has been directed to focus on supporting and complementing existing multinational forums.[31]

TTCP. Australia joined the original ABC countries in the TTCP in 1965. The TTCP provides a means of acquainting participating countries with defense research and development programs of other nations. The principal representatives are defense scientists, and included among the current subgroups are Subgroup S-Communications Technology and Command and Control Information Systems, and Subgroup X-Computing Technology.[32]

With a range of well established fora within which C3 issues may be examined with a view to maximizing interoperability, the effectiveness might be judged, at least in

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[30] Ibid., 2.3.

[31] Ibid., 3.1 - 3.3.

[32] ADFP 002, 9.1 - 9.8.

part, on the current interoperability between the US and Australian Armies. The current status of C3 interoperability between the Armies will be examined in relation to the:

1. Command and Control Doctrine
2. Communications and Information Systems interoperability

Command and Control Doctrine

The importance of common doctrine is reflected in former Commander US Forces Korea, General Robert W Riscassi's comments: "The first point is that a coalition must share a common doctrine to take advantage of commonalities."[33]

More recently and in light of considerable experience in multinational operations as Commander in Chief, US European Command, General George A Joulwan emphasized the importance of a common understanding of doctrine: "And key to the military aspects of multinational operations is doctrine."[34]

Command and Control Doctrine for the US and Australia at the joint and combined levels is set out in the US Joint Publication Series (Joint Pub) and the Australian Defence Force Publication series (ADFP) respectively.

The US and Australia share broadly similar doctrine in the application of command and control in the conduct of operations. The similarities begin, fundamentally with the recognition of the civilian power's primacy. Hence both the US and Australian

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[33] General Robert W Riscassi, "Principles for Coalition Warfare," *Joint Forces Quarterly*, Summer 1993, 60.

[34] General George A Joulwan, "Doctrine for Combined Operations," *Joint Forces Quarterly*, Winter 1996-97, 47.

military receive their ultimate direction and command and control form their respective NCAs. With some differences in the responsibilities of individual positions, the command of operations and the provision of support to operational commanders is similar in the US and Australia.

In the case of the US this is the President, with his authority being exercised through the Secretary of Defense. The chain of command runs to the Combatant Commanders (normally CINCs) for operations and through the Secretaries of the Military Departments, thence the chiefs of the individual services for the preparation of forces and their administration.[35] The CJCS is the principal military advisor to the President but has no direct command function.

In the Australian context the NCA is the Prime Minister and Cabinet. The Minister for Defense in Australia has no command function, rather he is responsible for policy. The Chief of the Defense Force (CDF) is the principal military advisor and the Secretary of the Department of Defense, a civilian public servant and responsible for the administration of the Department of Defense, is the principal civilian advisor to the Minister for Defense. The command of operations is then administered through the CDF as the commander of the Australian Defense Force. Command for operations is administered through the Australian Joint Commanders, Commander Northern Command and the Commander Australian Theater or, potentially, a specifically appointed Joint

[35] Joint Pub 3.0, 5.a.

Commander for a particular operation. Support to operations is the responsibility of the Service Chiefs in a similar manner to the US. [36]

Compatibility in command and control doctrine has been assisted by the ABCA. It is worth noting that the ABCA explicitly "recognizes the primacy of US operational level doctrine for use by the QWGs in their standardization efforts."[37] The issue then becomes how effectively has the intent of the ABCA and other US/Australia interoperability fora been transferred into reality in terms of agreed doctrine and adherence to it.

It is important to note that the ABCA nations have yet to agree on a common set of principles of war. [38] Given that these underlie all doctrine, it indicates that there is still some way to progress in reaching interoperability.

Australian doctrine recognizes fundamental principles for command and control as:

1. Unity of command
2. Span of command
3. Recognized chain of command
4. Continuity of command
5. Delegation of authority

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[36] ADFP 001, 4.1-4.15 & 4.35-4.48.

[37] *The ABCA Doctrine Guide*, 1.23.

[38] *The ABCA Doctrine Guide*, 1-3.

6. Control of scarce resources[39]

None of these would be alien to an American Army commander.

In terms of underlying philosophy, the US and Australian models for command and control are similar. Each emphasizes the necessity of a clear chain of command supporting the NCA with the fundamental attributes of unity of command and centralized decision making but decentralized execution.

Headquarters Models for Command and Control

Various models for headquarters organizations have been applied in the past. The multinational headquarters found prominence in World War II. The fully integrated staffs such as were seen in General Eisenhower's Supreme Headquarters Allied Expeditionary Forces Europe (SHAEF) provided the model for NATO headquarters and a number of the UN headquarters to support peacekeeping missions. The ABCA forum does not extend to a quadripartite alliance with the resultant headquarters. Neither does the ANZUS alliance require permanent headquarters. ABCA doctrine and US/Australia combined activities have sought to identify the most suitable model for a headquarters to command and control combined operations.

FM 100-8 discusses the difficulties in developing a doctrine for the most appropriate headquarters. It recognizes the difficulties in developing a model which will suit all alliances or coalitions: "Since no single command structure fits the needs of all

[39] ADFP 001, 7.23.

alliances and coalitions, several different models could evolve."[40] There is subsequently an examination of the multinational headquarters in alliances, with the parallel and lead-nation models being considered the most likely models for coalitions.

Australian doctrine on combined operations is limited in general to segments of publications dealing more particularly with joint service issues. ADFP 009 deals with combined planning and emphasizes the importance of unity of command: "operations may be bi-national or multinational but the principle of unity of command must be applied through the appointment of a single combined force commander (CFC)."[41] ADFP 009 continues that the country supplying the bulk of the force, or on whose territory the operation is to take place is likely to provide the CFC and probably the headquarters as well.[42]

The ABCA, not having established headquarters structures as exist within NATO, has indicated the lead-nation as the most likely to be adopted in ABCA scenarios. Command and Control, in most combined operations, will be guided by the *Lead Nation* concept. As opposed to creating a multinational headquarters to control, the Lead Nation concept recognizes that one nation will be assigned the lead role and its command and

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[40] FM 100-8, 2-2.

[41] Australian Defence Force Warfare Centre, Australian Defence Force Publication (ADFP) 009, *Joint Planning* (Canberra, Australia: HQ Australian Defence Force, 15 April 1994), 5.4.

[42] ADFP 009, 5.17.

control will predominate. Normally, the Lead Nation is that country providing the largest amount of forces for the operation.[43]

The model further acknowledges the relevance of national command and control, with national contingents retaining command of their contingents and the Lead Nation commander having OPCON of the contingent.[44] The Australian doctrine generally follows that of the ABCA with both acknowledging the possible need for staff augmentation from national contingents. FM 100-8 considers the Lead Nation concept the preferred model as well.[45] This model was practiced during ABCA Exercise CASCADE PEAK in 1996 and was effectively the model employed on Operation RESTORE HOPE.

During Operation RESTORE HOPE, the US initially provided a Marine Expeditionary Force (MEF) headquarters as the basis of a Joint Task Force (JTF) headquarters, United Task Force (UNITAF). The MEF headquarters subsequently handed over responsibilities for humanitarian relief operations to United Nations Operations in Somalia (UNOSOM) II. The 10th Mountain Division (10 Mtn Div) commanded the area into which the Australian 1st Battalion, the Royal Australian Regiment (1 RAR), battalion group was deployed. The MEF headquarters has effective

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[43] *The ABCA Doctrine Guide*, 1.38.

[44] *The ABCA Doctrine Guide*, 1.40.

[45] FM 100-8, 2-3.

operational control of the multinational elements as the lead headquarters.[46] Headquarters Australian Forces Somalia (HQAFS) located in Mogadishu provided liaison to HQ UNITAF, fulfilling the role normally undertaken by liaison officers or attached staff.

Exercise CASCADE PEAK involved 1 (United States) Corps with 1 (Canada) Division and 1 (Australian) Brigade (Mechanized) and a number of US brigades under its command. An integrated headquarters was attempted on Exercise NORTHERN LIGHTS in 1994, the previous ABCA CPX, with some problems arising from incorporating staff from several nations to form a headquarters and then soon after take part in a major exercise. The AAR for Exercise CASCADE PEAK states that the Lead Nation concept is especially suitable for an alliance such as the ABCA where there are no standing multinational headquarters such as exist in NATO. Rather it is likely that a coalition force of ABCA nations would "be put together for a specific mission, and exist only for the duration of the military operations which achieved that mission."[47]

Command and Control Terminology

Australian command and control terminology for joint and combined operations is similar. The terms agreed to under ABCA have been incorporated into the ADFP Series as Australian Joint and Combined terminology. These terms and their associated

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[46] Kenneth Allard, *Somalia Operations: Lessons Learnt* (Washington, DC: NDU, 1995), 16-19.

[47] ABCA Primary Standardization Office, *ABCA Exercise CASCADE PEAK 96, Post Exercise Report* (Washington, DC: ABCA Primary Standardization Office, 20 January 1997), A-7.

definitions are generally the same as the terminology applied to NATO. This is understandable, given that three of the four principals in the ABCA are also in NATO.

US doctrinal terminology for joint command and control differs in some detail from that agreed under ABCA (and NATO) for combined operations. The differences in terminology result, in part, as a consequence of the command and control arrangements under the various joint commanders in chief . US command and control procedures at the strategic/operational level incorporate the CINCs with geographic and in some cases functional responsibilities. These four star appointments are allocated forces and areas of responsibility by the US National Command Authority (NCA), that is the President and Secretary of Defense. The degree of authority granted over the joint forces under their control is specified as Combatant Command (COCOM).

COCOM is a term that is peculiar to the US command and control architecture. Broadly speaking it allows the commander the degree of authority to organize and employ commands and forces, assign tasks, designate objectives and give authoritative direction over all aspects of military operations, joint training and logistics necessary to accomplish the missions assigned to the command.[48] COCOM is not transferable, and in the US joint environment only Operational Control (OPCON) or Tactical Control (TACON) will be delegated. In a multinational setting COCOM may be exercised by the US commander, if so granted by the NCA, over US forces. A foreign commander will not exercise that degree of authority over US forces.

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[48] Joint Pub 0-2, 3.a.

The closest parallel to COCOM that exists in ABCA or NATO is Full Command. Full Command implies similar broad responsibility and authority for mounting a force and includes administrative command issues and the ability to operate with a great degree of latitude in configuring the force. It equates to full ownership. However Full Command is normally only applied internally to national forces, in much the same way as COCOM is applied in the US context. In the Australian context full ownership is only applied within a single service, with the exception that the Australian CDF exercises full command over all three services.

> In Australian doctrine command and control of combined operations is considered likely to be such that: "The Combined Chiefs of Defense Committee (CCDC) would exercise full command or operational command as appropriate, of forces assigned to the combined force through the Combined Forces Commander. National Command of forces assigned to a combined force would normally be retained by the chief of the respective defense force, exercised through the national contingent commander."[49]

Hence, full command of Australian forces might be administered by the Australian commander in a coalition with the US, with the American Commander administering probably either COCOM or OPCON, depending on the overall command structure and the country providing the CFC. However, as Full Command is only administered within single services in Australia, this would depend on the Australian contingent being drawn from the same service as the Australian contingent commander. The close parallels between COCOM and Full Command may be expected to be understood by the respective national participants in a combined force.

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[49] ADFP 001, 7.81.

There is arguably greater potential for some confusion when applying lower levels of command authority. The US has its own joint definition of OPCON, which differs significantly from ABCA/NATO OPCON. Employing the same term for different levels of authority is not a prescription for clear and well understood delineation of command and control in coalition operations.

Similarly US joint doctrine does not reflect the ABCA/NATO term Operational Command (OPCOM). US OPCON in fact assigns greater authority to the commander than either ABCA OPCOM or OPCON. Consequently, interpreting joint terminology into combined terminology potentially provides challenges for both the US commander and his multinational partners. The respective degrees of authority are basically are as follows:

1. US OPCON. May be exercised at any level below COCOM and is "the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. OPCON includes authoritative direction over all aspects of military operations and joint training necessary to accomplish the mission."[50]

2. ABCA OPCOM. The authority granted to a commander to assign missions or tasks to subordinate commanders, to deploy units, to reassign forces, and to retain or

[50] Joint Pub 0-2, ch 3, para 4.a.

delegate operational and/or tactical control as may be deemed necessary. It does not of itself include responsibility for administration or logistics.[51]

3. ABCA OPCON. The authority delegated to a commander to direct forces assigned so that the commander may accomplish specific missions or tasks which are usually limited by function, time, or location; to deploy units concerned and to retain or assign tactical control of those units. It does not include authority to assign separate employment of components of the units concerned. Neither does it, of itself, include administrative or logistic control.[52]

Clearly there are notable differences between US and ABCA command and control terminology. The US OPCON is not as specific in nature as the ABCA term, hence the limitations inherent in the ABCA term regarding "specific missions or tasks which are usually limited by function, time, or location" do not apply in the US joint term. US OPCON is sufficiently broad in application that it more closely approximates ABCA OPCOM, albeit with additional powers to prescribe the chain of command, organize commands and forces, suspend from duty/recommend reassignment of subordinate officers, delineate functional responsibilities and delineate geographic AORs.[53]

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[51] AAP 6, *NATO Glossary of Terms and Definitions* (Fort Monroe, Virginia: HQ Training and Doctrine command, 13 July 1995), 2-O-2.

[52] Ibid.

[53] FM 100-7, *Decisive Force: The Army in Theater Operations* (Washington, DC: HQ Dept of the Army, 31 May 95), 2-8.

US Joint and ABCA TACON are effectively the same in application. Both are limited to: "The detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned."[54]

Examining Australian Joint doctrine there are minor differences with ABCA doctrine. Already mentioned above is the use of Full Command in the Australian context. In addition, OPCON, although using the ABCA definition, may be delegated in Australian Joint operations, although this is not normally the case in the ABCA combined environment.

An Australian commander may make the transition from national joint command and control terminology to ABCA terminology with relative ease. For an American commander with a depth of experience in US national joint command and control terminology the problems are potentially more pronounced. The use by the US of terms which at once are the same term as ABCA (or NATO), yet mean somewhat different things is arguably the source of potential problems. An example of such confusion is related in FM 100-7, where the confusion which arose in Operations DESERT SHIELD/DESERT STORM between NATO and US commanders over the differences in doctrine are recounted. In addition, there is the problem of ensuring members of a combined force are aware of the peculiarities of the command and control of the other country (ies) in the force.

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[54] AAP 6, NATO Glossary of Terms and Definitions, 2-T-5.

US doctrine acknowledges the potential for difficulties in interoperability arising in multinational forces. In the absence of approved US Joint multinational doctrine, reference to the US Army's doctrine reveals: "Achieving and implementing international rationalization, standardization, and interoperability with allies, coalition partners, and other friendly nations is key to achieving the closest practicable cooperation among their military forces."[55]

FM 100-8 further discusses the importance of STANAGs and QSTAGs in NATO and ABCA respectively as a method of providing a transparent baseline to soldiers for cooperation within an alliance and as a means of obviating the requirement for alliance specific doctrine.[56] Certainly, the existence of ABCA agreed combined command and control terminology meets much of that requirement. The difficulty remains though if there is ignorance of the differences between ABCA/NATO terms and US terms. There would be less scope for misunderstandings in the critical area of command and control were the members to adhere to alliance terminology in the joint as well as combined arena.

Communications and Information Systems

The intent to operate closely together on combined operations may be present with both the US and Australia, a basic command and control structure may be agreed and the subtle and not so subtle differences in terminology may be identified. Possibly

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[55] HQ Dept of the Army, FM 100-8, *Combined Army Operations* (Washington, DC: US Army, 24 November 1997), 2-15.

[56] FM 100-8, 2-16.

the greatest potential impediment to combined operations will be non-standardization of communications. Achieving joint interoperability within national defense forces has proven a difficult and incomplete task in both the US and Australia. Achieving interoperability with allies presents even further challenges.

The first question to be addressed is what communications need to be considered in pursuing interoperability between the US and Australian Armies at the level appropriate to likely combined operations. Any commitment of Australian forces in a US-led combined operations will require communications at the strategic level between the NCAs of the two nations. Equally, it will be important that senior commanders at the strategic level are able to communicate on matters of strategic policy as they impinge upon the operation. The area of greatest challenge is internal to the deployed force, for example, the requirement for tactical communications that will support the operations of an Australian brigade operating as part of a US led force, as in the Exercise CASCADE PEAK scenario. The difficulties will arise in Australian systems interfacing to US systems to allow the commander of the force to effectively command all the components under his operational control.

The challenges for the US and Australia to achieve interoperability include addressing shortfalls in a number of hardware, software, and training areas. In the past the requirements for interoperability have been limited to a number of voice and telegraph circuits, specified in QSTAG 522, to be supplied to the subordinate headquarters by the superior. These specifications are no longer adequate in an era where

increasingly complex command and control systems are being deployed by ABCA Armies.

The US is the acknowledged world leader in the range and depth of new communications and information systems being deployed. By comparison, Australia, though an advanced western economy with a well-educated workforce and military, is endeavoring to adopt similar systems into its military, albeit on much smaller research and development and procurement budgets. Hence there is a risk of the gap between the deployed capabilities of the two nations growing.

Lessons from the Recent Past

Tests of US/Australia Army communications interoperability are relatively few in recent years. Australia has not deployed a substantial headquarters and combat force on operations since the Vietnam War. Lessons therefore need to be sought from the limited exposure the two Armies have had to each other, in Somalia and on exercise.

Operation RESTORE HOPE/SOLACE

The Australian deployment of a battalion group and a national contingent headquarters to Somalia for Operation RESTORE HOPE (known as Operation SOLACE in Australia) provides limited insight into the challenges of combined operations. The peculiar nature of the deployment and the relatively small size of the Australian contingent limited the potential challenges of achieving C3 interoperability,

The battalion group centered on 1st Battalion Royal Australian Regiment (1 RAR) was deployed to a Humanitarian Relief Sector (HRS) in the area of Baidoa, west of Mogadishu, and placed under OPCON to US ARFOR (10th Mountain Division).

Headquarters Australian Forces Somalia (HQ AFS) was situated in Mogadishu alongside the US HQ UNITAF. While the 1 RAR group was preoccupied with the conduct of humanitarian relief in the Baidoa area, HQ AFS undertook the role of providing the national command function on behalf of the Australian Defence Force and Australian Government. Later, as the situation matured, the battalion group reverted to under OPCON of HQ AFS. HQAFS then undertook a more direct operational role, in addition to its previous role as a national headquarters with liaison responsibilities to HQ UNITAF.

Specific comment on interoperability with US forces noted that, in general, staff procedures caused little difficulty. The complexities of the situation were noted to have been exacerbated by the different communications systems used by the USMC and US Army, both of which the Australian headquarters had to establish communications with.

The lack of compatible communications systems was the source of problems for the Australians. The 1 RAR battalion group was unable to access much of the information that US units received as an electronic transfer of information until 10 Mountain Division provided the necessary equipment, including a secure telephone, facsimile and data transfer equipment. This was possible because of the presence of an Australian Exchange Officer with the 11 Signal Brigade, then in support of 10 Mountain Division. He also provided support to HQ AFS. It is worth noting that this capability may not have been available but for the presence of the Australian exchange officer and was withdrawn on his departure from the Area of Operations (AO). Support via access to

the US troposcatter trunk communications system also provided the Australians at Baidoa and HQ AFS with telephone access.[57]

The Australian AAR commented that the 1 RAR Group and HQ AFS experienced some passage of information problems early in the deployment as the deployed battalion was unsure of the information requirements of the national headquarters as opposed to the HQ UNITAF. Finally the AAR noted that in relation to HQ AFS's role: "There is a need to establish doctrine for combined operations beyond the guidance provided in the ANZUS planning manual."[58]

The US also noted the difficulties of interoperability in Somalia, although not specifically with Australia. Allard stated among the lessons learnt: "The most significant potential for interoperability problems occurred between US forces and the multinational contingents."[59]

The improvised solutions to overcome these problems included deployment of US liaison officers to multinational units with their own communications links to the US headquarters and the delineation of national areas of responsibility with internal communications the responsibility of individual national commanders. Allard also notes the problems which arose when the robust communications infrastructure that 11 Signal

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[57] Australian Army Operational Evaluation Team, *Operation SOLACE Analysis of Command, Control and Communications* (Sydney, Australia: Land Headquarters, 1993), 8 & 10.

[58] Ibid., 5.

[59] Allard, 79.

Brigade, as an echelon above corps organization, was able to provide was withdrawn. As 10 Mountain Division's own signal battalion took over responsibility for communications in the area, they were less able to augment the limited communications of other national contingents. Additional problems were encountered in dealing with the different communications systems and software both within the US joint environment and among multinational forces.[60]

Allard completes his appraisal of the communications difficulties with the major lessons learnt: "In a peace operations, the inherent difficulties of command and control demand effective communications among the strategic, operational, and tactical levels. Diverse coalition forces generally mean wildly different communications capabilities - a fact of life that demands effective communications management."[61]

The US in Somalia experienced a number of problems with command, control and communications with the multinational force assembled there. The relative ease with which the Australian force was integrated into UNITAF reflects the core of common command and control doctrine and, probably equally importantly, similar national and military cultures. The command and control issues that arose were reconciled in spite of the deficiencies in some areas of doctrine. The greatest problems experienced between the US and Australian forces were in communications, through a lack of compatible systems.

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[60] Allard, 79-80.

[61] Allard, 77.

ABCA Exercise CASCADE PEAK

Exercise CASCADE PEAK was an ABCA sponsored corps level command post exercise held at Fort Lewis, Washington in 1996. Australian participation was as an independent brigade headquarters working directly to the US corps headquarters. The exercise tested the Lead Nation headquarters concept in particular, as well as a range of QSTAG agreements.

Overall, the AAR supported the use of the Lead Nation concept. The 1st (US) Corps was able to develop the necessary plans with limited augmentation from the other nations and in line with the coalition nature of the exercise. This was contrasted with the previous ABCA Exercise NORTHERN LIGHTS 94, where a more heavily augmented headquarters' effectiveness was hampered by the need to absorb large numbers of new staff onto the headquarters. The necessity of adequate numbers of suitable LNOs was highlighted, together with the need to ensure agreed common terminology is used in a coalition to avoid confusion on basic terminology.[62]

More specifically dealing with the communications and information systems issues, the AAR noted that, although limited access to the Lead Nation's command support systems was made available, the coalition integration was less than ideal. The report emphasized the need for an evolutionary approach to CIS interoperability and an understanding that deploying a C3 capability was comparable to a unique weapons

[62] ABCA Primary Standardization Office, *ABCA Exercise CASCADE PEAK 96, Post Exercise Report* (Washington, DC: ABCA Primary Standardization Office, 20 January 1997), 5-6.

system. The report further explains that without the trained personnel to support such systems their effectiveness is likely to be greatly diminished.[63]

The importance of giving adequate attention to these issues in a coalition was reaffirmed during the exercise: "The Provision of national command Information Systems (IS) to non-national subordinate formations must be addressed whenever planning for coalition operations or exercises."[64] Notably, however, CIS planning was overlooked as part of the exercise with the result that the AAR claims: "there were no relevant communications interoperability issues identified."[65]

Although Exercise CASCADE PEAK validated the effectiveness of the ABCA's favored coalition command and control it did not test the communications that would underpin it. Potentially significant C3 lessons are missing from an exercise where the communications that would have to be used were not deployed and tested.

Exercise TANDEM THRUST 97

Exercise TANDEM THRUST 97 was a combined US/Australian exercise held in Australia in March 1997. The US 7th Fleet conducted the exercise with 3 MEF providing the majority of US ground forces. US Army units from 25 Infantry Division (Light) and the Texas National Guard exercised closely with 3 Brigade from Australia.

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[63] Ibid., C-12 - C-14.

[64] Ibid., A-3.

[65] Ibid., C-14.

The US was the Lead Nation for the exercise, contributing larger forces than Australia to the exercise. Australia provided augmentation to the combined headquarters including the deputy force commander.

Key lessons were learnt in the area of communications and information systems interoperability between the US and Australia. It was the first opportunity for US and Australian communications systems to work alongside each other on a brigade and division level virtually since the Vietnam War.

The lessons gained from an Australian perspective were principally the need for:

1. Unclassified email access for interoperability with US Nonsecure Internet Protocol Routed Network (NIPRNET).

2. Obtaining at least limited access to US Secure Internet Protocol Routed Network (SIPRNET) classified internet due to the increased information passed on this means.

3. Interoperable Video teleconferencing (VTC).

4. Interoperable secure voice equipment.

5. Detailed planning, including for spectrum management and cryptographic material. [66]

It is interesting that some of these points have previously been identified as issues to be resolved as a result of past experiences, e.g., the problems with interoperable secure

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[66] C6 Staff (Australia), Enclosure 1 to *Ex TANDEM THRUST 97 Post Activity Report C6 (Australia) Staff Input* (Australian Joint Force Chief Communications Control Officer/Combined Force Deputy C6, Brisbane, Australia: HQ 1st Division, 12 May 1997), 1-9, AF 4/3/162

voice equipment in Somalia, and that all remain issues to be resolved. Also notable is the perceived benefit derived from the experience with the US Army of the Commanding Officer and Operations Officer of the 1st Signal Regiment, the Australian Army's main communications planning unit for the exercise. From that unit's perspective without the particular experience of key officers with US communications systems, "the level of interoperability achieved would have been significantly reduced."[67]

Communications Interoperability Issues

The examples already quoted provide a picture of a number of outstanding interoperability issues that have arisen in the past. However, a more complete examination of the status of interoperability includes issues not specifically mentioned in the after action reports. A review of the current status of interoperability reveals issues in the following areas:

1. Combat Net Radio (CNR), including frequency hoppers
2. Trunk Communications, to include satellite, radio relay and troposcatter
3. Telephone and Message Switches
4. VTC
5. Cryptographic equipment and material
6. Internet based technologies
7. Computer software

[67] 1 Signal Regiment (Australia), *Ex TANDEM THRUST 97 Post Activity Report* (Enoggera, Australia: 1 Signal Regiment, 22 Apr 97), A-1, 909-1-36

Achieving a degree of interoperability in these fields underpins current and future interoperability.

Combat Net Radio. Perhaps in part as a legacy of past Australian procurement of US radios, there is considerable interoperability in this area. The Australian RAVEN family of radios is interoperable with US SINCGARS, but not in the hopping mode, therefore negating part of the electronic counter counter measures of both radios. The commander of a US unit may be reluctant to sacrifice electronic counter counter measures for his force in order to achieve combat net radio interoperability with a neighboring unit from Australia. The fact that agreed segments of the frequency spectrum are used in both Australia and the US for military radios is, in part, the result of agreements broached in the past within the CCEB and ABCA fora. These spectrum segments allocated to the US and Australian militaries have been defended against commercial interests at the World Radio Conferences by the CCEB nations, an important product of the forum.[68]

Trunk Communications. The problems of achieving interoperability in trunk communications exist against a background of increasing demands of communications at brigade and above. Involving a variety of equipment capable of supporting multiple channels of information between headquarters over relatively longer distances, the contrasting requirements for the US and Australia and budgetary realities have dictated equipment choices. Arguably the ABCA forum recognized the importance of interoperable tactical trunk communications with the decision in the 1960s to cooperate

[68] Lieutenant Colonel Allan L. Black, Deputy Director Information Warfare Australian Defense Headquarters, email to author, 3 March 1998.

on the development and production of "Project MALLARD." The intention was to provide interoperability between the ABCA nations; however, the project did not reach fruition due to project costs.[69]

Subsequently the US has deployed Mobile Subscriber Equipment (MSE) and Australia is currently in the process of delivering its own PARAKEET trunk communications system to units. MSE was based on French GTE equipment. The Australian PARAKEET system is based principally on Israeli equipment, together with some Australian and British sourced equipment. While MSE was considered by Australia it was not procured.[70] Both MSE and PARAKEET are required to meet the ABCA agreed QSTAG for digital interfaces (QSTAG 788); however, this may not guarantee interoperability beyond the interface. The numerous supplementary hardware and software standards that support a modern trunk communications system, including telephone and message switches and the ancillary equipment that utilize its bearer capacity, must also be taken into account. The lack of any firm plans to test the interoperability of the respective systems as part of the introduction into service of PARAKEET does not indicate an early confirmation of the extent of interoperability possible.

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[69] Thomas-Durell Young, "Whither Future U.S. Alliance Strategy? The ABCA Clue." *Armed Forces and Society,* 17, 2 (Winter 1991): 284.

[70] Lieutenant Colonel John C. Collins, Australian Army Project Director Project PARAKEET, telephone conversation with author, Fort Leavenworth, Kansas, 18 December 1997.

The current procurement of PARAKEET provides for radio relay and satellite bearers, as well as the switches to move data and telephone traffic around the system. The interoperability of the radio relay systems will depend on interfaces and compatible spectrum. The Australian Army is reviewing options for troposcatter as part of a later phase of Project PARAKEET. Interoperability of Australian and US systems will potentially depend on the system selected. However, interoperability of the current PARAKEET system as planned for introduction into service in the Australian Army in 1998/99 with MSE is likely to prove difficult at best. In an exercise conducted by members of the Regimental officers Advanced Course at the Australian Army's School of Signals in 1997, students were unable to determine how they could successfully link PARAKEET with MSE, were the US and Australia to be deployed on combined operations.[71]

Satellite. The satellite terminal assemblies (STAs) being procured by Project PARAKEET are currently only able to work on Ku Band over the ADF transponder on the Australian domestic commercial AUSSAT satellites. This effectively limits use of these terminals to continental Australia with very limited utility in some areas immediately adjacent to Australia. As currently configured, the PARAKEET STAs would be ineffective in a combined operation with the US outside Australia. In addition, the US reliance on UHF and X Band satellite access precludes a PARAKEET and a US military STA being used in conjunction. Rather, as was the case on Exercise TANDEM

[71] Major Tom Washer, USA Exchange Officer at Australian School of Signals 1995/97, discussion with author, Fort Leavenworth, Kansas, 3 April 1998.

THRUST 97, they will have to be used as bearers for separate links. Plans for the procurement of multiband (Ku and C Band) terminals for the ADF and the potential to retrofit PARAKEET STA may provide for a more interoperable, or at least a more flexible STA for the ADF in the future. Sharing the limited US satellite capacity would have to be negotiated and would likely rely on borrowed US equipment. The likelihood is that US internal requirements on any major deployment may not leave a great deal of excess capacity for allies.

The ADF's limited budget precludes the likelihood of dedicated military satellites in the near future. It is likely that the ADF will remain dependent on access to commercial satellites via leased transponders or simply a normal commercial access. This is a potentially limiting factor on the ability of the ADF to provide the full range of communications and information systems, including command support systems, to deployed commanders. Commercial satellite capability is not always available to the extent required, given long term commercial contracts that may exist for commercial carriers. The ADF may find itself reliant on limited access to US military satellite capability, if this is deemed possible by the US after their own communications requirements are met.

Cryptographic Equipment and Material. Achieving a common standard of cryptographic equipment and material is essential if combined operations are to be successful. Underlying secure communications within an alliance is the provision of the necessary voice, messaging or other method of supplying information between allies.

Unfortunately, cryptography is also an area of understandable sensitivity and release of equipment and/or material even to close allies is not always possible. Experience in Somalia revealed the difficulties in achieving an exchange of information between Australia and the US on operations. National policies, or the local commanders' interpretation of these may preclude release of cryptographic equipment or material to the ally (Australia). During Exercise TANDEM THRUST 97 the lack of availability with US forces of STUIIIA secure telephones compatible with STUIIB phones used by the Australians, made secure telephone calls and PC to PC data transfers at times difficult to achieve.[72] In such circumstances effective cooperation between national forces is compromised. Close cooperation exists between Australia and the US on the provision of "Allied" cryptographic material; however, the problem is often ensuring all the relevant elements from both nations have the appropriate material.

VTC. The demand for secure VTC from commanders is increasing and it is an example of a relatively new technology which is now considered almost essential on operations. Senior commanders regard VTC as a major asset in conveying their intentions to their subordinates and in receiving briefings. Secure VTC was used extensively on Exercise TANDEM THRUST 97; however, the lack of interoperable secure VTC facilities with all elements was considered "a significant hindrance to effective C2."[73] The US has also yet to finalize an agreed joint standard for VTC

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[72] C6 Staff (Australia), *Exercise TANDEM THRUST 97, Post Activity Report*, 5.

[73] Ibid., 6.

technology; however, the experience of US forces in Bosnia reinforces that commanders now demand access to VTC. Hence for interoperability between future deployed Australian headquarters and the US commander, secure VTC might be regarded as essential to successful combined command and control.

Command Support Systems. The proliferation of internet based technologies is well known in the civil sector. Such technology has also been adopted to varying degrees by the Australian and US Armies and provides an insight into an area of future emphasis for interoperability. The US Army currently deploys both a classified SIPRNET and unclassified NIPRNET. The importance of interoperability with such systems was demonstrated on Exercise TANDEM THRUST 97, where the Air Tasking Order (ATO) was distributed over SIPRNET. Australian units without access to SIPRNET experienced problems with receipt of the ATO along with other operational information passed over that means. Greater success was achieved with unclassified email, where documents were able to be transferred between the Australian unclassified LAN and NIPRNET. The increasing use of internet email/ SIPRNET email instead of formal message traffic (US Automated Digital Network (AUTODIN) changing to the Defense Messaging System (DMS) and the Australian Defense Integrated Secure Communications Network (DISCON)) indicates that the ability to exchange email will take on increasing importance in the future. The ability to exchange email between US SIPRNET and Global Command and Control System (GCCS) and secure systems such as Joint Command Support Environment (JCSE) and the Battle Command Support System (BCSS) for the Australian joint and army command and control environments

respectively would prove an important aid to combined command and control.[74] This is even more clearly demonstrated in Bosnia, where the increased use of email at the expense of AUTODIN has lead communications staff to conclude "Email has replaced AUTODIN."[75]

Computer Software. The use of different computer software suites, usually for Office Suites is an ongoing source of difficulties both in the joint and combined environment. Allard noted that problems arose between the US components in Somalia during Operation RESTORE HOPE as they discovered they were using different word processing and email packages. Although this did not prevent file transfer between US components it did complicate communications and "it illustrates the growing importance of 'officeware' in military operations and the problems resulting from mismatches."[76] The Australian after action report also identified computer software as an operational issue, "There is a requirement for a single software for operational computer systems and formal staff training in its use."[77] This was also a problem mentioned in the Australian AAR for Exercise TANDEM THRUST 97, some four years later. The AAR notes that, despite a standard having been promulgated for the exercise, "very subtle software

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[74] Ibid., 2.

[75] Presentation notes on Operation JOINT ENDEAVOR to A307, Advanced Communications class, USACGSC, Fort Leavenworth, Kansas, 22 March 1998.

[76] Allard, *Somalia Operations: Lessons Learned*, 81.

[77] *Operation SOLACE, Analysis of Command, Control and Communications.*, 11.

incompatibilities were troublesome."[78] Within the Australian joint environment, the Army uses Lotus products whereas the other services use Microsoft. Similar differences existed between the USMC component and the other US services. Therefore, there is a lack of interoperability in the respective joint environments in addition to the challenges of achieving international alignment. The net effect is to complicate the ability of staff and units to easily transfer information around the battlefield.

Current Solutions

The existing solutions to interoperability problems have been demonstrated in both Somalia and more recently on exercise. During Operation RESTORE HOPE, UNITAF found the simplest and most effective solution to differing communications systems to be geographic separation of forces.[79] That worked reasonably well in the relatively static operational environment of the HRSs but, arguably, would not survive the fluid nature of a modern battlefield. In addition, UNITAF supplied LNOs with communications to a number of contingents and, in Australia's case, simply communications. The US supplied communications were, however, an important supplement to the Australian forces' own communications.

Summary

ABCA scenarios envisage an Australian brigade as part of a larger US led force. The assumption is that communications integral to the brigade will be Australian and

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[78] C6 Staff (Australia), *Ex TANDEM THRUST 97, Post Activity Report*, 3.B.

[79] Allard, 79-80.

links will be established between brigade headquarters and higher. Following QSTAG 522, communications will be supplied "higher to lower" and "left to right." Hence, this assumes sufficient spare communications capacity on the part of the respective units to provide subordinate and flanking allies, normally together with LNOs. However, is it part of the Modified Table of Organization and Equipment (MTOE) of units likely to work in a combined operation with the Australian Army to provide an Small Extension Switch and staff and LNOs to support C3 between allies? The assumption made in the Australian AAR for Exercise CASCADE PEAK that provision of US MSE equipment should be anticipated is in accordance with ABCA doctrine. Clearly, it is important that the US higher headquarters have a similar understanding. The AAR also states the requirement for Australian signals personnel to maintain familiarity with the MSE system, although it does not mention how this is to be achieved.[80] It overlooks a significant training challenge in achieving such a goal.

What is not dealt with is the added complications of new command support systems and their ability to interoperate. Another complication, considering the interservice difficulties often experienced within the US joint environment and equally in Australian joint operations, is the problems likely to be encountered in simultaneously communicating across both national and service boundaries.

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[80] Headquarters 1st Brigade (Australia), Exercise CASCADE PEAK AAR (Sydney, Australia: Headquarters 1st Brigade, 1996), 36.

Future Developments

Messaging. Current messaging over AUTODIN and DISCON respectively is based on the CCEB agreed ACP 127 standard. Currently the two nations are migrating toward a new standard, ACP 123, which will allow desktop messaging using the X400 format. Simple Message Transfer Protocol (SMTP) technology promises a further development in the area of messaging, using internet protocols. The US is migrating to this standard under DMS and the remainder of the ABCA/CCEB nations will have to consider following suit or risk future interoperability problems.[81]

Collaborative Planning Software. With the migration of many planning functions to software based systems capitalizing on the benefits that can accrue, the need to ensure that such systems are interoperable will become increasingly important. As aids to mounting and sustaining combined operation, effective collaborative planning software could allow remote planning in detail between US and Australian based headquarters.

Command Support Systems. There is an increasing emphasis on command support systems. The US has deployed the Global Command and Control Support System (GCCS) at a joint level and within the Army (Army Global Command and Control System), as well as the Maneuver Control System (MCS) for tactical command and control. Australia has the Joint Command Support Environment (JCSE) for joint command and control and the Army is developing the Australian Tactical Command Support System (AUSTACSS in its current UNIX based version) to be renamed the

[81] Lieutenant Colonel Ian Williams, Australian Liaison Officer to CCEB, email to author, Fort Leavenworth, 3 March 1998.

Battle Command Support System (BCSS) on its future fielding with a Windows NT base. The focus within Australia at present is on joint interoperability. There is however a acknowledgment of the need to achieve interoperability with US systems. The adoption by Australia of Australian Defense Formatted Messaging System (ADFORMS), which is compatible with the US Message Text Format (USMTF), is intended to provide an interoperable method of passing information between the systems.[82] Ensuring ongoing compatibility between systems as new technologies are adopted by the two nations and their respective services will likely prove challenging in such a dynamic area of development, including possible US migration toward increased reliance on internet protocol messaging. Maintaining interoperability also requires testing to ensure that the systems are, in fact, as interoperable as the designers have planned. A future combined US/Australian exercise may provide an opportunity to undertake such testing. However, it is likely that respective commanders would desire a proven system before employing it in a combined environment. One solution might be to deploy working models of Australian command support systems to the US Joint Interoperability Center at Fort Huachuca, Arizona, where technical testing could done away from the stresses of users in a combined activity.

Perhaps the greatest challenge facing armies around the world is keeping pace with the rate of change of C3 technology. Nowhere is the challenge greater then in maintaining interoperability with the US Army as it pursues digitization. Australia is not

[82] MAJ Steven P. Ellicot, C3I Development Branch Australian Defence Headquarters, email to author, Fort Leavenworth, 10 March 1998.

alone in considering the apparent dilemma of an already stretched defense budget coupled with the intention to maintain interoperability with its major ally, the US. The Australian Army, along with the US's other allies will have to contemplate how it will operate alongside a digitized US force. It is unlikely, at least in the short to medium term, that the Australian Army will be able to match the level of technology being deployed by the US. Although the Australian Army is monitoring US developments and is experimenting with the potential uses of digital technology in its "Restructuring the Army" trials, interoperability is liable to provide an even greater challenge in the future. Difficulties are likely to present themselves within the US Army, between the digitized and non-digitized force, let alone with its allies. The likely effect on the conduct of combined operations is one of frustration, as the force with superior technology is unable to fully leverage it given the inability of flanking forces to achieve the same level of battlefield visualization and speed of reaction. A major problem for the US to wrestle with will be just how much of the new technology will be accessible to allies and over what systems. It is unlikely that Australia will have the communications means to support some of the quantities of data a digitized division might expect to move around the battlefield. The US, if it requires the optimum performance from an Australian or allied unit may have to provide a higher level of liaison, complete with communications and information systems, to enable the ally to be included in the battlefield visualization. That in turn is bound to present questions of releasability to other nations. However, this may be the

price the US must pay to secure allied support on future operations and to ensure its effectiveness.

The Way Ahead

Combined Interoperability Environment. The CCEB and other US/Australian interoperability fora have recognized that there is a requirement for a "top down" approach to ensuring future C3 interoperability via a Common Operating Environment (COE). To that end there is agreement on a COE and on developing a Combined Interoperability Technical Architecture (CITA) among CCEB members.[83] The intention is that nations will adhere to the combined interoperability standards and that joint and individual service technical architectures will follow the parameters agreed at the combined level.

Ensuring an ongoing update to such standards, to keep them current and relevant will be a challenge. In addition, the domestic pressures likely to arise when C3 projects are developed may limit adherence to combined standards.

Commercial off the Shelf (COTS) Solutions. Another pressure for improved interoperability is the likelihood of increased future reliance on commercial products within both the US and Australian militaries. The proportion of research and development funds drawn from the civil sector for development of new communications and information systems products has grown rapidly during an era of static, if not shrinking, defense budgets. It is, therefore, increasingly likely that both militaries will

[83] Lieutenant Colonel Allan L. Black e-mail dated 3 March 1998.

continue to turn to leveraging civilian products for their own purposes. Pressures in the civilian sector for interoperability among businesses may, in turn, have a beneficial effect on military interoperability. An example of this may be the increased reliance on internet based technologies within military communications at a time of rapid growth in internet commerce.

Training. The importance of training in achieving interoperability can not be overlooked. The significant part that Australian officers with US exchange experience played in overcoming interoperability problems on Exercise TANDEM THRUST 97 has been mentioned above. In addition, there is the example of assistance to the Australians in Somalia that was able to be provided by the Australian exchange officer with 11th Signal Brigade. He was later, as Operations Officer of the Australian Army's 1st Signal Regiment, to be one of the key planners with US experience.

The importance of exchanges to provide a core of officers and enlisted soldiers with a sound understanding of allied armies' C3 systems is underlined by recent experience. The US and Australia enjoy a long standing and successful exchange program, which is key to interoperability across the two militaries. Arguably, key amongst those exchange programs are those that fall in the arena of C3, and particularly in communications and information systems areas.

The detailed knowledge to be achieved by exchange personnel needs to be reinforced by exercise programs that allow C3 systems to be tested in as realistic an environment as is possible. Combined exercise programs that exclude communications and information systems, are liable to teach incomplete lessons in the critical area of

command and control. Practicing command and control, whilst assuming communications links that are untested in reality, as occurred on Exercise CASCADE PEAK, may lead to dangerous assumptions as to the degree of interoperability the US and Australia really enjoy.

The Merits of Current Interoperability Fora

Given the current state of interoperability between Australia and the US, it is legitimate to question the merits of existing interoperability fora. Clearly, there remains much to be done. The problems associated with achieving interoperability, especially with regard to rapidly evolving communications technology, are not to be underestimated. Despite any perceived shortfalls, from an Australian Army perspective the ABCA, CCEB and other interoperability fora remain important.

The ABCA has produced a range of agreements over its life covering a broad range of topics, to include key areas within the C3 area. The C3 agreements have provided a sound basis for interoperability between the Armies but require constant updating and suffer from obsolescence as operational scenarios and technology force change. There are clear successes in achieving command and control interoperability as evidenced by the relative ease with which Australian Army elements have worked with the US Army in the recent past. However, these successes have been only at a fairly basic level and the message of interoperability achieved should not be overstated.

The potentially more difficult arena of communications interoperability has provided perhaps greater challenges. The ABCA has approximately 106 QSTAGs either in existence or in draft form to address the myriad issues associated with CIS

interoperability. These generally parallel the STANAGs that fulfill the same function in NATO. The QSTAGs cover a broad range of CIS issues including:

1. CIS management procedures
2. Critical content for communications and electronics operating instructions
3. Technical standards for the interoperability of key communications equipment
4. Management procedures for cryptographic material and equipment
5. Standards for the exchange of data
6. Use of the electronic spectrum
7. Electronic emission control standards
8. Common electronic counter counter measures
9. Standards for CNR
10. Information systems protocols

Many of the QSTAGs have been in draft form for years, indicating both the rate of change of technology and complexity of agreements, but perhaps also a lack of resources applied to completing the QSTAGs. The inadequacies of the current system have been recognized and there is renewed effort toward improving the rate of implementation of agreements. Included in this has been the employment of a consulting company in Washington DC to assist in the construction of an interoperability matrix and a more general move toward agreed standards rather than very complex interoperability guidance.

The major success of the CCEB has been the development and promulgation of the Allied Communications Publications (ACPs). These documents have ensured a basis

of combined and joint interoperability across the CCEB nations and have also provided a degree of commonality with NATO, especially important for Australia and New Zealand as non-member nations. In addition, some of the ACPs have been passed on to other regional allies in Australia's region, allowing increased interoperability between CCEB nations and other regional powers. The CCEB has also provided a venue in which to discuss other issues, such as developments in Information Operations and the implications of a migration toward COTS products. The series of Joint Warrior Interoperability Demonstrations (JWID) conducted initially by the CCEB nations has been expanded to include NATO countries and has provided a opportunity to demonstrate and exchange information on new communications technology and its potential applications. The move by the CCEB toward agreement on a Combined Technical Architecture is a positive step in providing guidance to ensure a overall basis for interoperability between Australia and the US, as well as the other ABCA nations. Of course, the greater the number of countries involved in the interoperability process, the greater the complications in reaching an agreement that meets the needs of all participants.

The achievement of C3 interoperability between the US and Australia is useful to both nations. However, the relative sizes of the two militaries and their scope of responsibilities, determine the relationship to be of relatively greater significance to Australia than to the US. It is, therefore, realistic that Australia be prepared to compromise where reasonable in order to achieve interoperability with the US. Generally, Australia has been prepared to follow the US lead on C3 issues in order to

achieve interoperability. In addition, Australia gains access to other important benefits through the various fora. These include access to technology, training and current thinking on doctrine and other matters not only in the US and other CCEB nations, but also, indirectly with NATO. The imperfections of the fora are well understood by the members; however, the benefits from an Australian perspective are significant in our maintaining the quality of the Army and interaction with a wider defense community.

Without a comprehensive understanding of how we are to achieve communications, any combined operation is likely to have an uncertain start. However, when operations commence is not the time to be sorting out communications protocols.

CHAPTER 5

CONCLUSIONS

The alliance between Australia and the US remains a strong one with a degree of interoperability built up virtually since World War II. However, there continue to be significant shortfalls in interoperability between the two nations. A review of current doctrine and equipment and recent experience in US/Australian C3 interoperability have pointed to a number of concerns.

Current command and control doctrine is comprehensive. With the exception of some differences in US terminology, which might lead to some confusion if not applied carefully, the problems are relatively minor. The separate definitions for 'Operational Control' within the US joint environment, as opposed to the ABCA combined doctrine, are a potential source of confusion, particularly where personnel may not be aware of the different meanings. However, the US and Australia benefit from being English speaking nations with similar political systems and similar military and civilian cultures. Of themselves, these parallels make combined command and control much easier and the remaining peculiarities of each nations' command and control may be relatively easily overcome.

Communications are a more problematic area. Despite cooperation dating back at least as far as the 1950s, there are concerns with the degree of communications interoperability achievable between the two militaries. The issues confronted by interoperability fora have grown in breadth and complexity to match the variety and proliferation of communications systems on the modern battlefield. The challenge is to

recognize the good work that has been done in maintaining the interoperability of the two Armies but also the shortfalls, current and potential. Chief amongst these is that interoperability between the Australian and US armies is more often the subject of agreements and assumptions than testing.

Interoperability amongst combat net radios is limited by a lack of compatible hoppers and different rates of progress toward digital radios, which will be required to support new tactical command and control support systems. Multichannel communication systems have agreed digital interfaces but different databases, and hardware and software render interoperability uncertain. Australian satellite systems are reliant on civilian communications satellites and the satellite terminals belonging to Project PARAKEET are not employable away from the Australian theater. There is also a lack of commonality amongst cryptographic equipment, which would potentially complicate secure communications on the battlefield.

The US and Australia have formally recognized the importance of their strategic relationship through the ANZUS Treaty and in their respective policies. In addition, the nations have emphasized the significance of interoperability as an issue in an era where coalition rather than unilateral warfare would seem to be the norm.

The ABCA, CCEB, and other interoperability fora have been implemented and maintained over many years with the aim of ensuring that, should the two armies be required to fight in an alliance, that alliance would not suffer unduly for lack of communications and other interoperability. Unfortunately, intentions and agreements have yet to be transformed into truly interoperable systems.

The ABCA recognizes the potential obstacles in achieving standardization as:

1. Ignorance of the Program. This is due to a lack of emphasis given to the Program by the Armies and a lack of publicity.

2. National Policies. These are reflected in restrictions on weapon systems and patents, by member nations.

3. Political and Financial Restraints. Brought about by national priorities especially where projects might have a large economic impact.

4. Inflexible Army Positions. Influenced by an unwillingness to compromise, particularly where national economics are involved, in the use of a nations' own product.

5. Introduction of Replacement Equipment. Matching replacement schedules between nations to achieve a common equipment is a costly exercise.[84]

The points reflect the realities of working toward interoperability in an environment where the potential benefits of achieving standardization are less apparent than more immediate political, economic and operational pressures affecting a country's army. For Australia the impetus toward interoperability with the US is considerable and has been explicitly stated in strategic policy.

The pressures of increasing numbers of coalition operations during a time of contracting budgets for most western militaries makes efficient cooperation all the more important. The US can benefit from Australian participation in US operations, as allied participation may lend credibility to a US initiated operation. Australia also has much to

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[84] *ABCA Armies Standardization Program information Handbook*, 9-10.

gain, for example, through access to US technology and the potential for US assistance, should an external threat to Australia's security develop. Finally, it should be remembered that Australia has its own strategic imperatives for involvement in world events.

Current command and control interoperability is adequate. The acceptance of the Lead Nation model within the ABCA and the successful conduct of a number of combined activities, including ABCA exercises in recent years, have established firm foundations for the understanding of combined doctrine. Integration of personnel into respective Army headquarters has demonstrated that common language and similar military cultures assist in overcoming any minor problems with terminology and national doctrine. The significant advantage that this brings to the US/Australia defense relationship should not be underestimated. However, the advantages can only be fully leveraged if members of the respective armies are familiar with each others militaries.

The use of appropriately experienced liaison officers and, in particular, personnel with experience of the other Army's communications and command support systems is critical to successful interoperability. The experience of the Australians in Operation RESTORE HOPE and during exercises such as Exercise TANDEM THRUST bears this out. The good fortune in the communications units involved in Operation RESTORE HOPE and during exercises, such as Exercise TANDEM THRUST, in the first instance, having an Australian exchange officer deployed with the US 11th Signal Brigade and, in the latter case, a commanding officer and operations officer in the major Australian unit

planning ground forces communications with US exchange service cannot be relied upon in the future.

It is unrealistic, given the relative sizes of the two militaries and the potential for Australian forces to be deployed with unfamiliar US units, depending on the area of operations, to expect US forces to have a deep understanding of Australian capabilities and doctrine. It will inevitably fall to Australia to shoulder more of the responsibility through ensuring a sound knowledge of US capabilities and doctrine. This will only occur if there is a continuing exchange of information and, importantly, personnel between the two nations. The complexity of communications and information systems requires exchanges of personnel to facilitate the firm grasp of allied capabilities and the potential problems in interoperability. To that end the current exchanges which allow officers of the Royal Australian Corps of Signals (RASigs) to serve at the US Signal Center and the US 11th Signal Brigade should be regarded as sensible investments by both armies. In particular, the exchanges allow RASigs officers exposure to developments in US communications technology and doctrine that would be difficult to replicate in the absence of the exchange program. It is regrettable that there are no longer any exchange positions for communications soldiers who are critical to ensuring successful operation of communications systems to also develop a knowledge of respective systems. There is also potential benefit to be gained from an exchange of personnel between US and Australian communications units that might be likely to serve together in any future combined operations.

Achieving the necessary communications interoperability to support combined activities will prove challenging. The two armies have very little common communications equipment, different combat net radios and trunk communications and with different command and control support systems in development. Although Australia uses principally US source cryptographic equipment, even that is not necessarily compatible with newer material being employed within US forces. In addition, there is the problem of ensuring compatible cryptographic keys, an issue fundamental to interoperability and a major security issue to be resolved.

The ABCA and CCEB and other subordinate interoperability fora have developed a quite comprehensive list of agreements; however, the rapid change of CIS technology, differences in equipment between the US and Australia and complexity of agreements make the task an increasingly difficult one. In addition, existence of agreements does not ensure knowledge or adherence.

The move toward a common operating environment for ABCA/CCEB nations as detailed in the CITA is a promising development. By establishing broad, albeit theoretical, binding parameters for combined CIS interoperability architecture within which individual nations can construct their own military systems, there is the promise of common standards, even with different equipment.

The general move toward COTS solutions to military CIS requirements also holds the possibility of nations, including Australia and the US, being driven toward common standards derived from a commercial sector, where the interoperability imperative is perhaps more immediate. The current reality is that there are numerous options in the

civilian sector, for example, for computer operating systems. Hence, for the foreseeable future the interoperability fora remain critical to achieving agreed standards for CIS. The impetus should therefore be to support the agreements reached such as the CITA.

A fundamental flaw in the current progress toward C3 interoperability is the lack of opportunity for and emphasis on communications exercises among the respective ABCA armies. Although there are regular CPXs as stated above, on very few of these exercises is communications interoperability tested. Exercise TANDEM THRUST 97 was arguably the first occasion since the conflict in Vietnam where significant ground forces communications systems were tested between Australia and the US. In CPXs the "path of least resistance" and least cost has too often been chosen, where effective interoperable communications are assumed.

The conduct of dedicated communications exercises between Australian Army communications units and their US counterparts, particularly those with responsibilities in the Pacific, would also provide a degree of familiarity with different systems and procedures. Australia currently conducts regular joint and combined communications exercises within its national forces and those of New Zealand, the HICOMMEX/JCOMMEX series. Comparable communications exercises between Australia and the US may provide a relatively inexpensive method of improving interoperability.

Another potential source of interoperability testing may be systems interoperability trials conducted at a suitable facility. The US Joint Interoperability Test Center at Fort Huachuca, Arizona, could serve as the model for such a facility and may be

able to conduct such trials, as it would be in the US interest as well as Australia's to confirm the extent of current interoperability.

Commanders must accept that unless communications systems are tested together, preferably in support of an exercise with real users and real users' problems, a degree of interoperability between Australian and US forces will tend to be taken for granted. The reality is that the interoperability may not be achievable to the degree or in the time frame commanders will demand in order to effect proper command and control of forces.

The single most significant problem in achieving interoperability in any field, and perhaps particularly in the complex and expensive field of communications, is the will to devote necessary resources toward the goal. C3 interoperability is not a responsibility that can be delegated to communications staffs and neatly assumed away. It is ultimately the responsibility of commanders to identify the requirements to ensure force readiness and, in particular, their own ability to command forces. Lieutenant Colonel M.J. Ryan of the Australian Defence Force Academy states this responsibility clearly: "Commanders own command systems; they must therefore be informed owners of the development process. Any commander that dismisses CIS issues as 'wiggly amps' is blatantly abrogating his responsibility."[85] If government policy dictates that interoperability with allies is a priority, especially when it is as clearly established as the latest Australian Strategic Guidance, then it behooves senior commanders to take an active interest in what is being done to ensure it. Resources must be devoted to interoperability fora and to C3

[85] M. J. Ryan, "Whose Business IS IT?" *Combat Arms* (Headquarters Training Command Australian Army) Issue no 1(1997): 18.

projects to enable proper consideration to be given to interoperability issues. Having done so, if it is determined that interoperability is too expensive or too difficult to achieve as may be desired, then that is a decision that can be agreed at the appropriate level and as the result of risk analysis. Unfortunately, the lack of exercising of communications and clear understanding of current limitations appears to be the result of benign neglect rather than careful calculation.

GLOSSARY

Coalition: An ad hoc arrangement between two or more nations for common action

Combined: Between two or more forces or agencies of two or more allies (When all allies or services are not involved, the participating nations and services shall be identified, e.g., Combined Navies)

Command and Control: The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by the commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.

Command and Control System: The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned.

Command, Control, Communications, and Computer Systems (C3): Integrated systems of doctrine, procedures, organizational structures, personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control across the range of military operations.

Common Operating Environment (COE): The common operating environment provides a familiar look, touch, sound, and feel to the commander, no matter where the commander is deployed. Information presentation and command, control,

communications, computers and intelligence system interfaces are maintained consistently from platform to platform, enabling the commander to focus attention on the crisis at hand.

Communications: A method or means of conveying information of any kind from one person or place to another.

Communications Net: An organization of stations capable of direct communications on a common channel or frequency.

Communications Network: An organization of stations capable of intercommunications, but not necessarily on the same channel.

Communications Security (COMSEC): The protection resulting from all measures designed to deny unauthorized persons information of value which might be derived from the possession and study of telecommunications, or to mislead unauthorized persons in their interpretation of the results of such possession and study.

Interoperability: The ability of systems, units or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together. The condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases.

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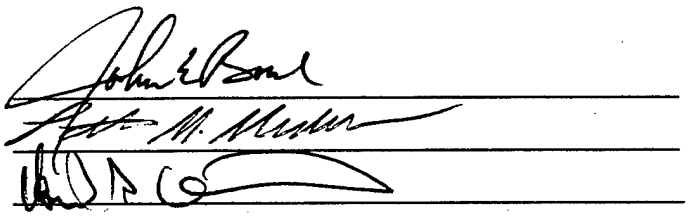

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